



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,190	04/02/2004	Steven George Hansen	081468-0309021	7518

909 7590 10/02/2006

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

EXAMINER

GUTIERREZ, KEVIN C

ART UNIT PAPER NUMBER

2851

DATE MAILED: 10/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/816,190	Applicant(s) HANSEN ET AL.	
	Examiner Kevin Gutierrez	Art Unit 2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 4-8 and 11-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 9, 10 and 14-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 September 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed September 4, 2006 have been fully considered but they are not persuasive.

Page 9 of the Remarks, the applicant states "The masking blade 160 is not configured to define an on-axis, substantially rectilinear intensity distribution on the beam at a pupil plane of the illumination system." The Examiner respectfully disagrees. See paragraph [0041], lines 3-6, where the masking blade forms a rectangular illuminated area. See figure 1, where a pupil plane is denoted by the crossing of solid lines within the masking blade 160 and another (in dashed lines) within 170).

Further, the applicant states that "the Examiner has not made a proper showing of a motivation, suggestion or teaching to combine." The Examiner respectfully disagrees. As stated in the previous Office Action (page 5, paragraph 2), where the suggestion of Orino of using polarized light is at paragraph [0031], lines 7-9. Furthermore, obtaining a substantially higher intensity beam is at least one of several motivations to combine according to one skilled in the art. To clarify, a polarizer as taught by Inoue would vary the intensity of a beam within a given range from low to high. This is the manner of the interpretation of obtaining a substantially higher intensity beam. In addition, a polarizer would also promote the development of achieving an image of a high resolution as taught in prior art.

Page 10 of the Remarks, the applicant states that Orino and Inoue do not disclose, teach or suggest “at least one pupil shaping element constructed and arranged to impart an intensity distribution that is not symmetric in an interchange of two orthogonal axes at a pupil plane of the illumination system; and a polarizer configured to impart a linear polarization to the beam.” The Examiner respectfully disagrees. As recited above, Orino discloses the at least optical element and further discloses where the optical element imparts an intensity distribution that is not symmetric in an interchange of two orthogonal axes ([0059], lines 1-4). Inoue, as recited above, discloses a polarizer to impart a linear polarization to the beam. Therefore, the combination of the Orino and Inoue provided the at least structural limitations of the claim and disclose the claimed invention.

For the at least reasons provided above, the combination of the references provided disclosed the claimed invention. Therefore, rendering the instant application as unpatentable.

Drawings

2. Figure 3B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not

Art Unit: 2851

accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 9-10, 14 and 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orino (US 2003/0020892) in view of Inoue et al. (5,673,103).

Regarding claims 1 and 18-19, Orino discloses

- “an illumination system (fig. 1, 100; illumination apparatus) configured to condition a beam of radiation;
- a support structure ([0048], line 1) configured to support patterning structure (200; mask), the patterning configured to impart the projection beam with a pattern in its cross-section;
- a substrate table ([0051], line 1) configured to hold a substrate (W);
- a projection system (300) configured to project the patterned beam onto a target portion of the substrate (W);

Art Unit: 2851

- at least one pupil shaping element (160; masking blade) constructed and arranged to define an on-axis, substantially rectilinear intensity distribution on the projection beam at a pupil plane of the illumination system ([0041], lines 3-6, where the illuminated area is in a rectangular form; see fig. 1, where a pupil plane (denoted by the crossing of solid/dashed lines) is located within 160 and/or 170)).”

Orino does not disclose “a polarizer, constructed and arranged to impart a linear polarization to the projection beam.”

However, Orino suggests the use of polarization beams ([0031], lines 7-9) and having “a polarizer, constructed and arranged to impart a linear polarization to the projection beam” is known to the art as it is evident by the teaching of Inoue et al. (See, where 1 is a polarizer; col. 7, lines 35-36). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the illumination system of Orino by including a polarizer to obtain a substantially a high intensity beam and/or achieve an image of high resolution.

Regarding claims 2 and 22-23, Orino further discloses “wherein said intensity distribution is a rectangle having an aspect ratio not equal to 1, and the longer dimension of the rectangle is parallel to the X or Y axis of the apparatus ([0041], lines 3-6, where the movable blades are variable to adjust the size of the rectangular aperture).”

Art Unit: 2851

Regarding claims 3 and 24, Inoue et al. further disclose “wherein said linear polarization is substantially parallel to the longer dimension of the rectangle (col 7, lines 62-65).”

Regarding claim 9, Orino “wherein the center of said intensity distribution (see fig. 1, where the radiation beam denoted solid and dashed lines are centered around the optical axis OA) lies on the optical axis (OA) of the illumination system (100).”

Regarding claim 10, Orino discloses a mask, but does not disclose “further comprising a phase-shift mask as said patterning structure.”

However, having “phase-shift mask as said patterning structure” is known to the art as it is evident by the teaching of Inoue et al. (col. 7, lines 41-43, where a phase shift mask can be used instead of a photomask).” Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the patterning structure of Orino by using a phase shift mask for at least the purpose of controlling the polarization characteristics of the projected beam.

Regarding claim 14, Orino further discloses “wherein said at least one optical element comprises a set of moveable blades ([0041], lines 3-5).”

Regarding claim 17, Inoue et al. further disclose “wherein said illumination system comprises a radiation source that emits a linearly polarized beam (col. 8, lines 16-18). ”

Art Unit: 2851

Regarding claim 20, Inoue et al. further disclose “wherein in said linearly polarizing, the direction of the linear polarization imparted to the beam is substantially parallel to lines of said pattern (col. 7, lines 62-65).”

Regarding claim 21, Orino as modified disclose the limitations as set forth in claims 2 and 3.

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Orino in view of Inoue et al., as applied to claim 1 above, and in further view of Nishi (6,608,665).

Orino as modified discloses with an aperture corresponding to said intensity distribution. Orino as modified not disclose wherein said at least one optical element comprises a diaphragm having an aperture or apertures corresponding to said intensity distribution.”

However, having “at least one optical element comprises a diaphragm having an aperture or apertures corresponding to said intensity distribution” is known to the art as it is evident by the teaching of Nishi (see fig. 9, where 56 is diaphragm with apertures 58-61). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify the optical element of Inoue et al. as modified by having a diaphragm with variable apertures for at least the purpose to adjust the intensity distribution of the illumination or exposure light.

Art Unit: 2851

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Orino in view of Inoue et al. and Nishi, as applied to claim 15, and in further view of Onanian (4,568,148).

Orino as modified, discloses all of the claimed limitations except “wherein said polarizer comprises a polarizer mounted in the or each aperture of said diaphragm.”

However, having “said polarizer comprises a polarizer mounted in the or each aperture of said diaphragm” is known to the art as it is evident by the teaching of Onanian (col. 8, lines 1-2, where the polarizing wheels have polarizing arcuate segments). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify the polarizer of Orino as modified by using a polarizing wheel for at least the purpose to obtain an image of a higher resolution.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on

Art Unit: 2851

the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Gutierrez whose telephone number is (571)-272-5922. The examiner can normally be reached on Monday-Friday: 8:00 a.m. - 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571)-272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2851

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin Gutierrez
Examiner
Art Unit 2851

September 27, 2006

Rodney Fuller
Primary Examiner
